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ABSTRACT

The infusion of technology in schools, colleges, and departments of education (SCDEs) may be placed along a continuum. At one end of the continuum, technology infusion is described as not being central to the teacher preparation experience. At the other end of the continuum, progress is represented by changing courses and changing thinking. This Digest reviews preservice student use and teacher education faculty use of technology as well as the institutional capacity of SCDEs. Models of technology integration at the University of Virginia, Western Illinois University, and Michigan State University schools of education are identified as having implemented long-term efforts to infuse technology throughout their programs. Support for change includes the National Council for Accreditation of Teacher Education revision of standards for implementation in the year 2000; and States requiring more capability with technology through licensing and certification standards. Positive movement along the continuum is represented by a report from the National Commission on Teaching & America's Future indicating that SCDEs are doing much more to meet the challenge of technology infusion than is commonly believed. (Contains 9 references)(LL)

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Technology in Teacher Education: Progress Along the Continuum

Judy A. Beck and Harriet C. Wynn

Introduction

Schools, colleges, and departments of education (SCDEs) may be placed along a continuum in their integration of technology. The 1995 Office of Technology Assessment report, *Teachers & Technology: Making the Connection*, spoke to one end of the continuum when it raised two important points—that "technology is not central to the teacher preparation experience" and that "most technology instruction . . . is teaching *about* technology . . . not teaching *with* technology across the curriculum" (p. 165). However, the other end of the continuum has been captured by Pellegrino and Altman in the design dimensions outlined below. These dimensions illustrate "changing courses and changing thinking" and provide a conceptual framework to describe the work of Peabody College at Vanderbilt University (TN) in incorporating technology in teacher education:

> The first design dimension . . . involves moving students from consumers and participant observers of technology-based learning applications to producers of content applications appropriate for their own teaching. . . . The second design dimension . . . involves the shift of technology applications from supplementary to central in a given course's learning activities. . . . The third design dimension. . . . represents a gradual and progressive increase in the sophistication and complexity of the technology-based applications that students experience in a course. In part, this dimension captures the fact that over the length of their teacher preparation program students mature in their own understanding and sophistication with respect to content knowledge, pedagogical content knowledge, and knowledge of technology. (1997, pp. 96-99)

This Digest will review preservice student and teacher education faculty use of technology and SCDE institutional capacity. Several examples of SCDE programs that have integrated technology into teacher education will be presented and factors supporting change will be highlighted.

A Snapshot of SCDE Integration of Technology

During the fall of 1996, a survey on technology was distributed to member institutions responsible for teacher education programs as part of the American Association of Colleges for Teacher Education (AACTE) and National Council for Accreditation of Teacher Education (NCATE) Joint Data Collection System. The study shows a number of positive aspects of the use and potential use of both basic and interactive information technologies within teacher education (Persichitte, Tharp, & Caffarella, 1997). While there is room for improvement in technology utilization, the idea that schools of education are technologically bankrupt is not supported. To the contrary, in student use, faculty use, and institutional capacity, SCDEs are moving forward and in some cases, leading the way.

Preservice Student Use of Technology

At 40% of the responding SCDEs (n=466; 63% return rate), students are required during the on-campus part of their program to design and deliver instruction incorporating various technologies. Students at another 50% of the SCDEs are required to demonstrate the use of at least one technology during their on-campus classes. At 28% of the SCDEs, students are required to design and deliver instruction that incorporates various technologies during the student teaching experience. Almost all institutions provide students accessibility to basic word processing, spreadsheet, and presentation programs. Students at 57% of the SCDEs have access to advanced electronic technologies.

As the survey results indicate, trends for using technology in on-campus classes are positive. However, use of technology does drop off during student teaching. Schools of education have been encouraged to continue to identify and implement technology-rich instructional strategies within required preparation course work.

Faculty Use of Technology

Faculty members at 45% of the SCDEs responding regularly use computers, televisions, and VCRs as interactive instructional tools during class periods. Faculty members at another 53% occasionally use some technology to present information during class periods. In addition, 81% of SCDEs require students to use computer applications to complete assignments. Faculty use of e-mail is primarily to communicate within the SCDE (93% of institutions). However, at 67% of responding SCDEs, faculty use e-mail to communicate with colleagues at other institutions and to collaborate on projects.

These findings are encouraging as current literature continues to stress the importance of the use and modeling of multiple technologies by higher education faculty responsible for the preparation of future teachers. Faculty use technology to present information during class, to conduct research, and to communicate with peers.

Institutional Capacity

At the time of the survey, 42% of the SCDEs responding had classrooms wired for the Internet. Fully 98% of the institutions reported that they have classrooms with televisions and videocassette recorders available for instructional purposes. In terms of planning, 55% of SCDE had budgeted a plan to purchase, replace, and upgrade a variety of educational technologies, while 38% had a plan but did not have a supporting budget.

The majority of preservice students have access to some advanced electronic technologies and software applications. SCDEs generally have well-equipped classrooms and their information infrastructure is generally part of a budget plan for purchase, replacement, and upgrades.

Programs Model Technology Integration

Three schools of education that have been identified as having implemented long-term efforts to integrate technology throughout their programs are Curry School of Education at the University of Virginia; College of Education and Human Services, Western Illinois University; and College of Education, Michigan State University (AACTE, 1998).

Curry School of Education, University of Virginia

In the mid-1980s the Curry School designated education technology as one

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strand for integration throughout the program with the goal of ensuring that preservice teachers will be prepared to integrate appropriate uses of educational technologies in their own teaching after graduation, and serve as leaders for other teachers. The school developed partnerships with local school divisions and state policy makers as essential elements in the work. Specific programs include TeacherLink, a regional telecommunications network; Public Education Network (PEN), one of the nation's first statewide K-12 Internet systems; CaseNET, a series of case-based courses on the World Wide Web; the Technology Infusion project (TIP), pairing preservice teachers with local classroom teachers; and others. The Curry Educational Technology Center provides support and resources within the school (Curry School of Education, 1997).

College of Education and Human Services, Western Illinois University

The College of Education and Human Services, Western Illinois University, aided by remarkable success in achieving external and state funding, developed interactive multimedia laboratories, developed numerous electronic classrooms, established an instructional video lab and a faculty development lab, made use of compressed video to link to school districts, established a distance learning program with a middle school located 90 miles from campus, developed technology competencies for its teacher education program, redesigned the curriculum in 12 different courses, and employed instructional designers to assist faculty in course development (Smith, Barker, Baker, & Dickson, 1996).

College of Education, Michigan State University

The College of Education at Michigan State University designed its technology integration program to achieve four objectives: (1) to prepare a new generation of K-12 teachers who are able to use technology creatively and critically to enhance student leaning, (2) to prepare a new generation of teacher educators who are able to use and model the use of technology to enhance student learning, (3) to prepare a new generation of educational researchers who are able to investigate educational uses of technology, and (4) to support K-12 schools in their efforts to enrich student learning through the use of technology. Michigan State mobilized top graduate students to support teacher educators and teacher candidates in integrating technology in their teaching and learning and established unique laboratories to support research on teaching with technology. A technology exploration center, authentic assessment of technology competencies for teacher education students, and implementation of an educational technology certificate program are a few of the other program components (Michigan State University, 1997).

Support for Change

The OTA report cited "time, limited resources, faculty comfort level and attitudes, and little institutional encouragement for technology use" as barriers to a more integrated use of technology in SCDEs (1995, p. 187). A group of deans from teacher education institutions in the northeast cited a similar list in late 1997—with lack of funding leading the way. Of the 93% of responding institutions to the 1996 AACTE/NCATE survey that have plans for purchasing, replacing, and upgrading technology, only 55% have budgets for such actions. Up to this point, federal and state monies that have been made available for educational technology advancements and professional development have not been accessible to higher education. The E-Rate discounts do not apply to schools of education or their libraries. SCDEs are learning to make the case within their own institutions for technology-related funding and are forming partnerships and consortia to strengthen resources.

NCATE is in the process of revising its standards for implementation in the year 2000. Current unit standards reflect recommendations from the International Society for Technology in Education (ISTE). New standards for the infusion of technology in teacher education programs and a vision for what skills and understandings graduating students should bring into the classroom will be a significant facet of the revisions (NCATE, 1997). As states require more capability with technology through licensing and certification standards, schools of education will align programs to produce new teachers able to meet those requirements.

Positive Movement on the Continuum

The National Commission on Teaching & America's Future, in its report *What Matters Most: Teaching for America's Future* (1996), posed this challenge: "Schools of education . . . need to model how to teach for understanding in a multicultural context, how to continually assess and respond to student learning, and how to use new technologies in doing so" (p. 77). America's schools, colleges, and departments of education are doing much more to meet that challenge than is commonly believed. The teachers of tomorrow are being prepared today in environments that increasingly are infused with technology, moving toward the reality of the 21st century.

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